

A Study on the Variability of Sea Level in the Mediterranean
Using the merged TOPEX/Poseidon, ERS1 altimeter product, along
with ERS1 scatterometer and AVHRR data

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The Mediterranean is a complex basin where inflow-outflow through the Strait of Gibraltar, Straits of Sicily, thermal and wind forcing, all have an effect on the variability of sea level. Sea level residual from a merged TOPEX/Poseidon ERS1 product, winds from the ERS1 scatterometer, and sea surface temperature from the NOAA/NASA AVHRR-Oceans Pathfinder project are used to examine the long-period variability of sea level.

Results from analyzing the merged data set. indicates that the annual cycle of sea level in the Western Basin leads the Eastern Basin by 10 days with a maximum in both basins occurring in the October time frame with an amplitude of 8-10 centimeters. A similar analysis of sea surface temperature is consistent and shows a maximum amplitude of 8 degrees, with both cases showing higher amplitudes in the Eastern Basin. To recover regional patterns of coherence a rotated EOF analysis was applied.

Several REOF modes showed a propagation along the Algerian Coast, along with intensification of gyres in the Western Basin in the late Fall, early Winter time frame. To determine the effect of the wind forcing a correlation analysis was performed indicating that the anticyclonic gyres of the Alboran Sea are not forced by the winds. In the Western Basin, along the Algerian Coast, the surface variability appears to be dominated by the winds and the Eastern Basin, specifically the Levantine Basin, appears to have higher correlations with the wind field.